

WHAT IS CLAIMED IS:

5b B1 / 20. A silicon single crystal produced according to Czochralski method to which Ga (gallium) is added as a dopant wherein a resistivity is $5 \Omega \cdot \text{cm}$ to $0.1 \Omega \cdot \text{cm}$.

21. A silicon single crystal produced according to Czochralski method to which Ga is added as a dopant wherein concentration of Ga in the crystal is 5×10^{17} atoms/cm³ to 3×10^{15} atoms/cm³.

22. The silicon single crystal to which Ga is added according to Claim 20 wherein concentration of interstitial oxygen in the single crystal is 20×10^{17} atoms/cm³ (ASTM'79) or less.

23. The silicon single crystal according to Claim 20 wherein a diameter of the single crystal is 4 inches or more.

24. A silicon single crystal wafer produced according to Czochralski method to which Ga is added that is produced by slicing the silicon single crystal according to Claim 20.

25. The silicon single crystal to which Ga is added according to Claim 20 wherein the silicon single crystal is for a solar cell.

26. The silicon single crystal wafer to which Ga is added according to Claim 24 wherein the wafer is for a solar cell.

27. A silicon single crystal solar cell produced using the silicon single crystal to which Ga is added according to Claim 20.

28. A silicon single crystal solar cell produced using the silicon single crystal wafer to which Ga is added according to Claim 24.

29. The silicon single crystal solar cell according to Claim 27 wherein the area of the solar cell is 100 cm² or more.

30. The silicon single crystal solar cell according to Claim 27 wherein a conversion efficiency of 20 % or more.

31. The silicon single crystal solar cell according to Claim 29 wherein a conversion efficiency of 20 % or more.

32. The silicon single crystal solar cell according to Claim 27 wherein the silicon single crystal solar cell is for space use.

33. The silicon single crystal solar cell according to Claim 27 wherein a rate of lowering of a conversion efficiency due to photo-degradation is 0.5 % or less.

34. The silicon single crystal solar cell according to Claim 29 wherein a rate of lowering of a conversion efficiency due to photo-degradation is 0.5 % or less.

35. The silicon single crystal solar cell according to Claim 30 wherein a rate of lowering of a conversion efficiency due to photo-degradation is 0.5 % or less.

36. The silicon single crystal solar cell according to Claim 32 wherein a rate of lowering of a conversion efficiency due to photo-degradation is 0.5 % or less.

37. A method for production of silicon single crystal wafer to which Ga is added according to Czochralski method wherein Ga is added in a silicon melt in a crucible, a seed crystal is brought into contact with the silicon melt and is pulled with rotating to grow a silicon single crystal ingot.

38. The method for production of silicon single crystal wafer to which Ga is added according to Claim 37 wherein addition of Ga to a melt in a crucible is conducted by growing a silicon crystal ingot in which Ga of high

concentration is added previously, and crashing the silicon single crystal doped with Ga in high concentration to prepare a doping agent, and adding Ga in the silicon melt using it.

39. The method for production of silicon single crystal wafer to which Ga is added according to Claim 37 wherein the number of rotation of a crucible while the single crystal ingot is grown is 30 rpm or less.

40. The method for production of silicon single crystal wafer to which Ga is added according to Claim 37 wherein a pressure in a furnace of a pulling apparatus while the silicon single crystal is grown is in the range of 10 to 500 mbar.

41. The method for production of silicon single crystal wafer to which Ga is added according to Claim 37 wherein an amount of inert gas to be flown in a furnace of a pulling apparatus while the single crystal is grown is in the range of 10 to 500 l/min.

42. The method for production of silicon single crystal wafer to which Ga is added according to Claim 37 wherein the inert gas flown in the furnace of the pulling apparatus while the single crystal is grown is argon.